

sions very long and slender, crossing each other and passing up the sides of the body, between legs 5 and 6, half way to the lateral carinae; outer portion of each division composed of two slender subequal closely applied pieces; anterior division of gonopods small, conical and not projecting beyond the opening in the segment; the margin of the opening through which the gonopods project thinly raised, highest on the sides.

Coxae of third male legs each with a rounded, hispid lobe on the ventral face.

Motyxia expansa, n. sp.

One male (type) and two females collected at "The Grapevine" below Fort Tejon, Calif., February 28, 1929, by O. F. Cook. U.S.N.M. no. 2093.

Diagnosis.—Differing from Chamberlin's *tejona* and *monica* in minor details of the gonopods, and from the latter, at least, in the more restricted carinae of segments 18 and 19.

Description.—Male 25 mm long and 4.5 mm wide, the largest female 27 mm long and 5 mm wide; male almost as convex as females.

Living color in general light salmon which is most intense on the lateral carinae and along the posterior half of the segments; head, antennae, legs and ventral surface uncolored.

Segments 2, 3 and 4 of typical shape but segments 17, 18 and 19 with lateral carinae much less produced than those of *monica*, segment 19 being almost completely hidden within 18 and its posterior angles small, inconspicuous and very widely separated.

Gonopods as shown in Fig. 19, rising from a transversely oval opening having a thick raised rim behind.

Third male legs each with a rounded coxal lobe, higher than broad, at the inner angle; sternum between fourth legs with a pair of broad, low, rounded elevations.

Remarks.—It is obvious that *expansa*, *tejona*

and *monica* are very closely related, but if details of the authors' drawings of the gonopods of these species are compared, it will be seen that specific differences exist. Following the description of *tejona* (Proc. Acad. Nat. Sci. Phila., 99: 25, 1947) Chamberlin listed the other species in the genus but overlooked *monica*. Having done so, it is probable that he did not compare *tejona* with its closest known relative, but he did compare it with the more distantly related *kerna*.

Motyxia exilis, n. sp.

Several males, one the type, and several females collected at Woodford, near Tehachapi, Calif., January 8, 1928, by O. F. Cook. U.S.N.M. no. 2094.

Diagnosis.—The three slender terminal divisions of the gonopods immediately distinguish this species.

Description.—Somewhat more sturdy than *expansa*, a small male being 25 mm long and 5.5 mm wide and the largest specimen, a female, 30 mm long and 7 mm wide, the males obviously less convex than females.

Living color not noted but the alcoholic specimens are light in shade.

Segments 2, 3 and 4 of customary shape. Segments 17, 18 and 19 with posterior angles backwardly produced; those of segment 18 most prominent; those of segment 19 very small and widely separated; posterior angles of these three segments more acute in males than females and moreso than in either *monica* or *expansa*.

Gonopods as shown in Fig. 20. They protrude from an opening extending backward at middle between the coxae of the eighth legs and with the margining rim higher and thinner than in *expansa*, the coxae less widely separated than in that species.

Males with coxae of third legs each with a smaller lower lobe than in *expansa*; sternum between the fourth legs with the two transverse elevations more pronounced than in *expansa*.

HERPETOLOGY.—A new snake of the genus *Oligodon* from Annam. ALAN E. LEVITON, Natural History Museum, Stanford University, Calif. (Communicated by Doris M. Cochran.)

Recently Dr. Doris Cochran, of the United States National Museum, submitted the entire collection of the genus *Oligodon* in the Museum to me for study. She called my attention to one specimen from Indo-China

that she was unable to identify and presumed to represent a new species. Subsequent study has led to the confirmation of Dr. Cochran's suspicions.

Oligodon annamensis, n. sp.

Holotype.—U.S.N.M. no. 90408, young female, from Blao, Haut Donai, Annam, French Indo-China; collected by E. Poilane, March 11, 1933.

Diagnosis.—The new species of *Oligodon* differs from all previously described forms by a combination of the following characteristics: Maxillary teeth 8, anal shield single, scales in 13 rows, loreal absent, 6 upper labials, 1 postocular, internasals present.

Description.—Rostral well developed, as broad as deep, the portion visible from above less than half its distance to the frontal. Internasals broader than wide, not separated by the rostral; profrontals larger than the internasals, about one and one-third times as broad as wide, in contact with the second upper labial, nasal, and preocular shields; frontal one and one-third times longer than its distance to the snout, somewhat longer than broad, two times as wide as the supraocular, slightly shorter than the parietals; nasal large, partially divided; loreal absent; one preocular and one postocular; temporals 1 + 2. There are six upper labials, the third and fourth enter the eye; the order in decreasing size is 5, 6, 4, 3, 2, 1. Six lower labials, the first four in contact with the anterior genials which are about two times as long as the posterior shields.

Ventrals 170; subcaudals 30; anal single; scales in 13-13-13 rows.

Maxillary teeth 8, the extreme anterior portion of the maxillary bone edentulous. Three well developed palatine teeth present; no pterygoid teeth were observed.

Eye moderate, its diameter equal to twice its distance to the lip; pupil round.

Measurements.—Total length, 249 mm; tail length, 29 mm.

Coloration.—(Specimen preserved in 75 per cent alcohol.) Ground color light brown. On the head there are several areas of white, black-edged blotches; these include an interocular band, a short interparietal bar, and some small areas on the anterior portion of the snout. The rostral is white, strongly spotted by dark flecks as are the white areas of the bars on the head. A white blotch just in front of the eye covers parts of the second and third upper labials; another blotch extends from the fifth and sixth upper labials diagonally forward to the top of the head where it meets with the interocular band just above the eye. Both of these lateral white areas extend onto the lower labials and genials. There is a long oblique stripe on the neck which extends forward

and onto the posterior edge of the parietal; this stripe does not meet its fellow on the parietals. The body is transversed by a series of white black-edged bars, some of which are indistinct; this pattern extends onto the tail. Most of the body scales are edged by darker brown and are all peppered by fine dark flecks.

Ventrally the ground color is white; many of the ventrals and subcaudals are either partially or completely covered by dark brown or black quadrangular spots.

Remarks: There are but three species in the genus *Oligodon* with which *annamensis* could be confused, i.e., *ornatus*, *catenata*, and *violaceus pallidocinctus* (= *cinereus*, var. IV of Smith, 1943). It can be distinguished from these three forms as follows: *ornatus-annamensis* has an undivided anal plate and 13 scale rows while *ornatus* has a divided plate and 15 scale rows; *catenata-annamensis* has a single anal plate and a distinct pair of internasal shields while *catenata* has a divided anal plate and lacks internasals; *cinereus*,

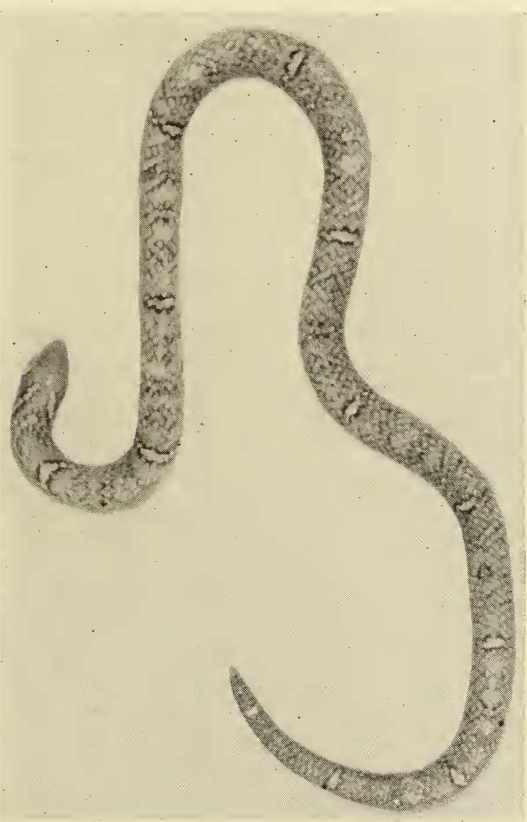


FIG. 1.—Holotype of *Oligodon annamensis*, U.S.N.M. no. 90408.
(Photograph by Antenor L. Carvalho)

var. IV—*annamensis* lacks the loreal and has 13 scale rows while *cinereus* has a loreal shield and either 15 or 17 scale rows.

There can be little doubt that *annamensis* represents a "degenerate" species. This is exemplified by the reduction in the number of head shields, i.e., loss of the loreal, fewer upper labials, and low number of scale rows. Since the tendency toward the reduction in numbers of scales is to be found among many species that represent several species groups within the genus *Oligodon*, great care must be exercised in the interpretation of these traits, and any conclusions concerning relationships derived from such data must be accepted on a provisional basis. A thorough study of the structure of the hemipenes, a problem that I am at present working on, seems to offer the only means by which the seemingly complex evolutionary history of the genus will be unscrambled.

ICHTHYOLOGY.—*The fishes of the tidewater section of the Pamunkey River, Virginia.* EDWARD C. RANEY and WILLIAM H. MASSMANN, Cornell University and Virginia Fisheries Laboratory.¹

The distribution of the fish fauna of the tidewater section of most of the rivers that flow into Chesapeake Bay is poorly known. Indeed, this is true for practically all the great rivers tributary to the Atlantic from the Hudson southward to the Savannah. The few investigations usually have concentrated on commercial species and our understanding of distribution has been inferred from the knowledge of nearby Coastal Plain streams reported in such studies as those by Hildebrand and Schroeder (1928), Fowler (1945), Raney (1950), and Massmann, Ladd, McCutcheon (1952).

In 1949 the junior author began a study of the spawning and early life history of shad in the Pamunkey and other nearby Virginia rivers and collected with seines at numerous locations in the tidal area. After exploratory seining, many of the stations were visited at almost weekly intervals during the period June 28 to September 29, 1949. Since that time additional collections have been made at established stations on the Pamunkey indicated on the map (Fig. 1).

¹Contribution from the Virginia Fisheries Laboratory.

Because of the lack of data concerning the structure of the hemipenes to be found in *annamensis*, any statement of relationships must be for the present considered purely speculative. However, from the evidence available it seems most likely that *annamensis* was derived from *cinereus*. The validity of this supposition must be determined in the future when and if additional specimens of this species, particularly males, may be available for examination.

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A minnow seine, 20 feet long and 4 feet in depth, was used in all but six collections when a net 75 by 6 feet was employed. All seines had a bar mesh size of $\frac{1}{4}$ inch. The collections included 113 samples taken by minnow seine, 15 by surface trawl, 6 by rotenone, 4 by bottom trawl, and a series of plankton net collections which often contained small fishes. Continuous observations were made on the commercial and sport fisheries. Many of the collections were sent to the senior author, who is responsible for the identification of all but the clupeid fishes. A total of 59 species were taken in the Coastal Plain region of the Pamunkey River and its tributaries; 52 were limited to the tidewater section.

DESCRIPTION OF THE LOWER PAMUNKEY RIVER

The Pamunkey River (Fig. 1) originates on the Piedmont plateau at the confluence of the North and South Anna Rivers, 5 miles northeast of Ashland, Va., and empties into the York River at West Point. The tidal region extends about 42 nautical miles upstream to the vicinity of Bassett Bar. At West Point, salinities ranging from 0 to